Examples of Success Stories and Technology Transfer @ CSEM

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The challenge in technology transfer

- CSEM background
- Transfer through R&D projects with established companies
- Transfer through start-ups
CSEM Mission

Development and transfer of microtechnologies to the industrial sector – in Switzerland, as a priority – in order to reinforce its competitive advantage

Creation and maintenance of technological platforms
Integration of technologies
Industrialization of technologies
Transfer to the industrial sector

Forms of transfer:

1. Cooperation agreements with private companies
2. Encouraging the creation of startups
CSEM at a glance

- Incorporated, not-for-profit Research and Technology Organization (RTO), supported by the Swiss Government

- A public-private partnership
  - 31% public
  - 69% private

- Key figures (2012)
  - Revenues ~ CHF 70.0 mio
  - Employees ~ 400
CSEM’s technology programs

- MEMS
- Surface engineering
- Systems
- Ultra-low-power integrated systems
MEMS for Watches

- Microsystems technology: deep reactive ion etching of silicon
- Constant force escapement
Watches, examples of parts

Wireless communication

- 2.4GHz RF front-end for BT-LE
- EM 9201-2 product

- Standard digital 0.18um CMOS
- Tiny thanks to customized inductors
DSP for Mobile consumer goods

- Low-power customizable (in VHDL) and configurable (at run-time) processors
- Macgic 16/24-bit DSP (quad MAC) with very high parallelism (1.5 k cycles for a 256 FFT)

- Abilis is a fabless semiconductor company providing RF modulators, secure media processors and broadcast-to-IP solutions.
- Abilis Systems Sàrl was acquired by ALi Corporation in 2012
A revolutionary emergency watch

- Esthetic accessory for increased personal security ([www.limmex.ch](http://www.limmex.ch))
- Suitable antenna for obtaining optimum GSM communication even in closed spaces

- Good acoustic performance of the built-in speaker and microphone
- Robust and easy-to-use system, with low electricity consumption
Micro-assembly

- Development of compact solutions for handling and assembly of small components
- Focused on flexible feeder systems and compact delta robots

- Employs today 20 highly qualified people, mostly engineers and technicians
- Asyril is a member of CPA Group SA, a group of 160 people active in general automation
Pocket-Delta: A micro-robot for micro-assembly

1990

2002

Berner Fachhochschule
Hochschule für Technik und Informatik

Development & Integration

2007

Transfer & Industrialization

TODAY

asyril
Avalon Photonics AG in 2000

- Core activities: Production of VCSEL chips, arrays and subassemblies for sensing and datacom applications
- In 2006, Bookham acquired Avalon Photonics to extend its product offerings in the datacom and sensing markets

- Became part of the Advanced Photonic Solutions division (APS) of Oclaro in 2009
- Today shipping > 50 Million laser diodes annually
- Very recently sold to II-VI Incorporated for $88.6 Million
HEPTAGON – Micro optics for smart phones

• Spun off from Helsinki University of Technology in 1993
• Acquired replicated micro-optics activity of CSEM in 2000
• Focus on imaging, sensing and light sensor applications in smart phones

• Pioneer in wafer level micro-optics design and high volume manufacturing
• Optical design / precision engineering in CH; Manufacturing in ASIA; Computational imaging, system and software in US
Heptagon at a glance

- Founded 1993; acquired Swiss RCA Research micro-optics lab
- Top-tier OEM customers
- >1 billion smart devices shipped by 2013
- ~800 employees

Zürich: Precision Engineering, Optical Design
Shenzhen: Manufacturing Engineering & Customer Response Team
Silicon Valley: Computational Imaging, System & Software Innovation
Singapore: Corporate Headquarters, Product Engineering, Manufacturing

Christian Tang-Jespersen
CEO & President

S.C. Leong
COO
Desmond Lim
CFO
Ohad Meitav
CTO
Markus Rossi
CIO
Hartmut Rudmann
SVP Eng
Raymond Quek
SVP Bus Devt & Strategy
Rene Kromhof
VP Sales & Marketing

IBM | Avago | ZORAN | csem | MIT | Avago | ASML
Technology & Product

Micro Optics
- WLO
  - Imaging Lenses
  - Light optics
  - Sensing optics
- WLS
  - Precision stacking
  - Spacer technology
  - light tight

Micro Modules
- WLI
  - Sensing
  - Light
  - Opto-Electronics
  - PCB/ceramics
  - MEMS

Imaging Systems
- WLM
  - Front-facing camera
  - Experience camera
  - Primary camera

Wafer-Level Integration & Processing

Micro Optics
Micro Modules
Front-Facing Camera
Primary Camera
Smart Mobile Devices

- Primary Camera
- Proximity Sensors
- FOV Camera
- Computational Imaging
- Front Facing Camera
- TOF Gesturing
- High Q Flash
- Ambient Light Sensors
- FF IR LED
- LED Flash

Current
Future
Heliotis AG in 2005

Core activities

- Development and commercialization of parallel optical low-coherence tomography (pOCT) for 3D machine vision and low-cost biomedical imaging

Contact

- Heliotis AG
  D4 Platz 4
  CH-6039 Root Längenbold (Switzerland)

- [www.heliotis.ch](http://www.heliotis.ch)
- info@heliotis.ch
MESA Imaging AG in 2006

Core activities

- Development and commercialization of 3D cameras that allow the imaging of the environment in all three dimensions. Target markets include security, building automation, transportation and agriculture.

Contact

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  Technoparkstrasse 1
  CH-8005 Zürich (Switzerland)

- [www.mesa-imaging.ch](http://www.mesa-imaging.ch)
- [info@mesa-imaging.ch](mailto:info@mesa-imaging.ch)
CSEM’s start-ups & spin-offs

- > 500 jobs created
- > 120 MCHF revenues (2010)
- > 200 MCHF VC investments
Summary

- CSEM is an active player in the promotion of innovation and transfer of technology
- Contributes to the economic growth through collaborations with established industries and the creation of start-ups

A contract of confidence, *year after year*

- More than **150** companies exploit CSEM technologies annually
- Support of public funding including from the EC is instrumental for CSEM’s mission
Thank you for your attention!